EP850 Series

Intel® Merom Core™ 2 Duo/C-M Penryn
All-In-One EPIC SBC
User's Manual

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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CHAPTER 1
INTRODUCTION

The All-In-One EPIC board **EP850 Series** supports Intel® Core™ 2 Duo and C-M Penryn processors at FSB 667/800/1067 MHz with graphics, audio and Gigabit Ethernet interfaces. It practically integrates chipsets Cantiga GM/GL45 and ICH9M to support excellent Multiple I/O, LVDS LCD, Gigabit Ethernet and HD digital Audio interface that make all in one single board as a computing engine. It is equipped with one 204-pin DDR3 SO-DIMM with maximum 4GB system memory, LVDS + CRT display devices and one PCI-104 for 32-bit/33 MHz PCI expansion. Additionally, it provides you with unique embedded features, such as two RS-232 serial ports, six USB2.0 ports for high speed peripherals. It can achieve the best stability and reliability that makes your system perform the most endurable operation in any critical environments. The built-in Watchdog Timer has enhanced the system reliability that achieves a unique feature to distinguish itself from other boards.

1.1 Specifications

- **CPU**
  - **Intel® Core™ 2 Duo and C-M Penryn processors**
- **Chipset**
  - **Cantiga GM/GL45 and ICH9M**
- **Bus Clock**
  - **677/800/1066 MHz FSB**
- **BIOS**
  - American Megatrends Inc. BIOS.
  - 8Mbit SPI Flash, DMI, Plug and Play
  - SmartView for multiple LCD type selection, display mode option and application extension features
  - "Load Optimized Default" to backup customized Setting in the BIOS flash chip to prevent from CMOS battery fail
- **System Memory**
  - One 204-pin DDR3 SO-DIMM socket
  - Maximum to 4GB DDR3 memory
- **L2 Cache**
  - Integrated in CPU
- **CompactFlash™ Socket**
  - One CompactFlash™ Type II Socket
- **Onboard Multi I/O**
  - Two RS-232
  - Two SATA-II connectors
- **USB Interface**
  - Six USB ports with fuse protection and complies with USB Spec. Rev. 2.0
- **Real Time Clock**
  - Integrated Intel® ICH9M
- **Watchdog Timer**
  - 1~255 seconds; up to 255 levels

- **Graphics**
  - Integrated in the Cantiga GM/GL45 for LVDS, CRT, DisplayPort
  - LVDS port from LFP support 24/48-bit as 1*40-pin connector
  - VGA from DAC port as D-sub 15-pin connector
  - External DisplayPort via JST 20-pin connector for cabling configuration
- **Expansion Interface**
  - One PCI-104 for 32-bit/33 MHz PCI expansion with PCI v1.1 compliant
- **Ethernet**
  - Dual Giga-bit Ethernet
  - Two RTL8111B Giga-bit Ethernet controllers via PCIe x1 with integrated Boot ROM with RPL and PXE
- **Audio**
  - Realtek High Definition codec audio
  - MIC-in, Line-out
- **Power Management**
  - ACPI (Advanced Configuration and Power Interface)
- **Form Factor**
  - EPIC form factor

NOTE *All specifications and images are subject to change without notice.*

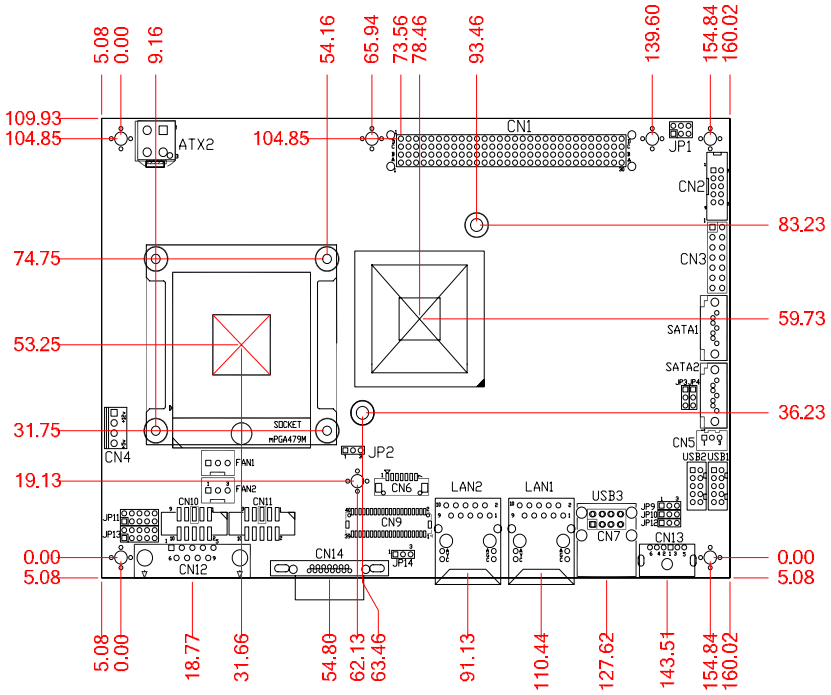
1.2 Utilities Supported

- Chipset Driver
- VGA Driver
- Ethernet Driver
- Audio Driver

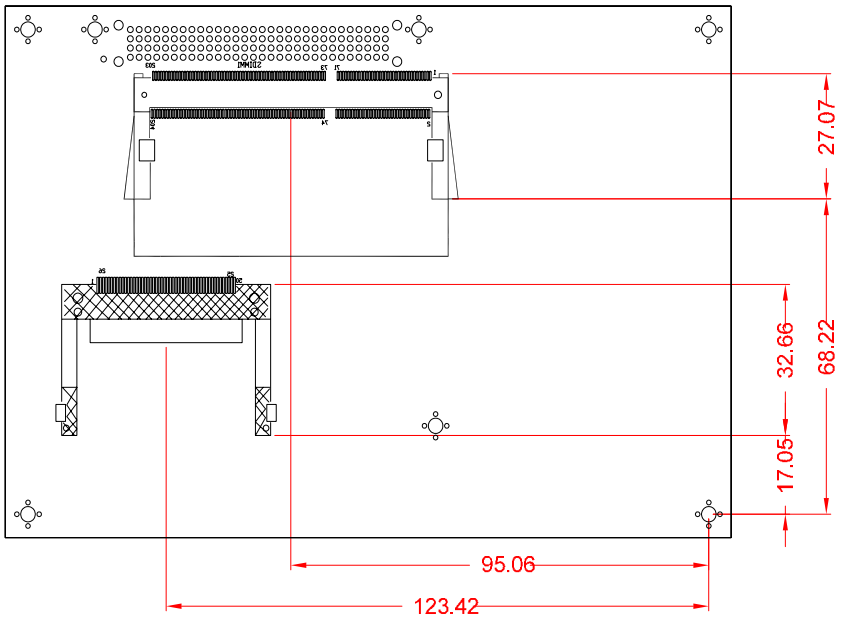
CHAPTER 2

JUMPERS AND CONNECTORS

2.1 Board Dimensions and Fixing Holes

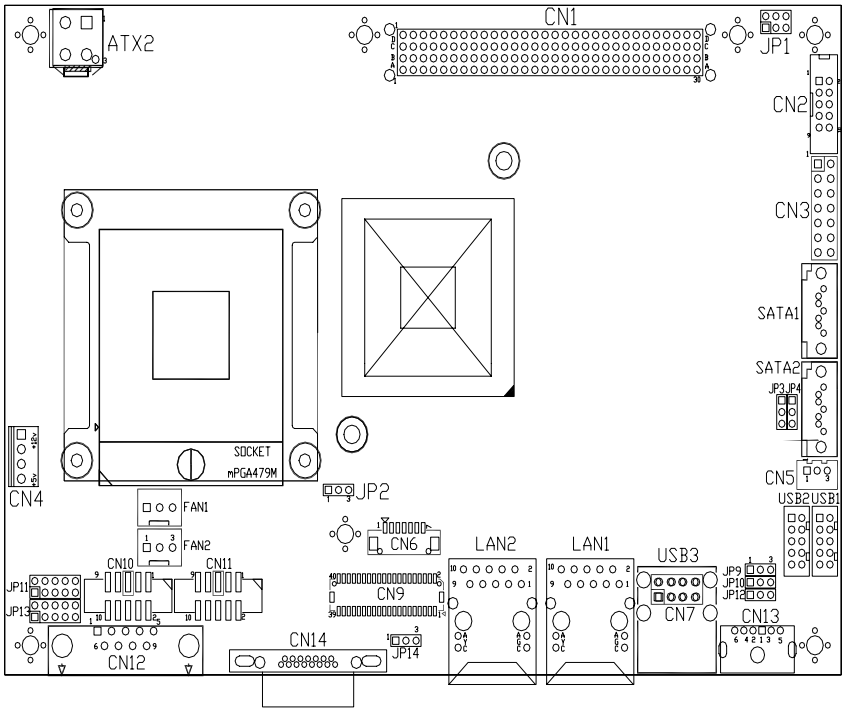


Component Side

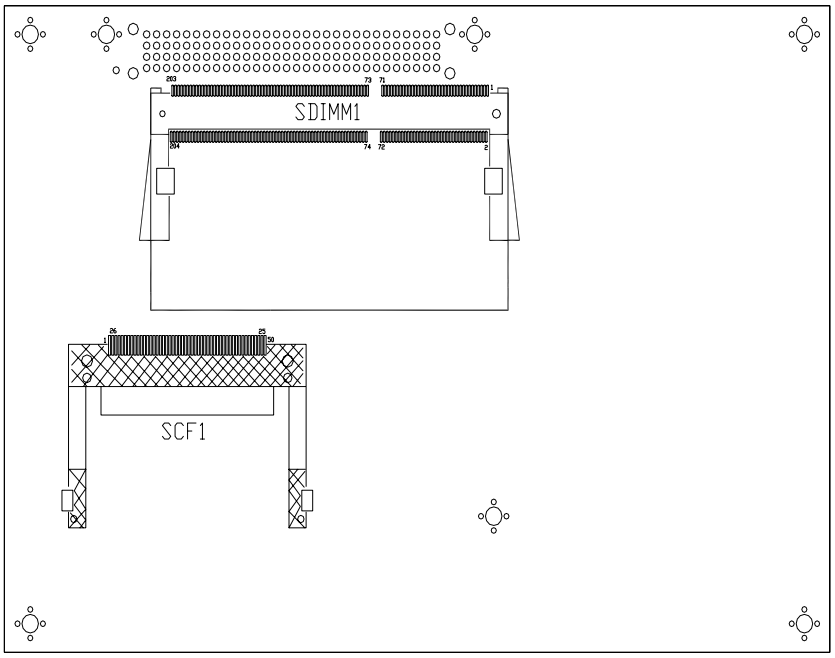


Solder Side

2.2 Board Layouts



Component Side



Solder Side

2.3 Jumper Settings

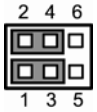
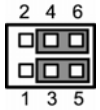
Proper jumer settings configure the **EP850** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

Here is a list of jumper settings：

Jumper	Default Setting		Jumper Setting
JP1	Audio Speak Out/Line Out Selection Default: Line Out		Short 1-3, 2-4
JP2	Auto-Power Button Selection Default: Manual		Short 1-2
JP3	Compact Flash Voltage Selection Default: 3.3V		Short 1-2
JP4	Normal Operation/Clear CMOS setting Default: Normal Operation		Short 1-2
JP9	USB Voltage Selection Default: +5V		Short 1-2
JP10	USB Voltage Selection Default: +5V		Short 1-2
JP12	USB Voltage Selection Default: +5V		Short 1-2
JP11	COM2 Mode Select	COM2 Pin 1: DCD	Short 7-9
		COM2 Pin 8: RI	Short 8-10
JP13	COM1 Mode Select	COM1 Pin 1: DCD	Short 7-9
		COM1 Pin 9: RI	Short 8-10
JP14	LVDS Voltage Selection Default: Line Out		Short 1-2

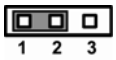
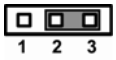
2.3.1 Audio Output Selection Jumper (JP1)

This jumper makes the selection of Audio output.

Description	Function	Jumper Setting
Audio Output Selection	Line Out (Default)	
	Speak Out	

2.3.2 Auto-Power Button Selection Jumper (JP2)

This jumper let you select either Auto or Manual power button.

Description	Function	Jumper Setting
Power Buttom Selection	Manual Power Buttom (Default)	
	Automatic Power Button	

2.3.3 CompactFlash™ Voltage Selection Jumper (JP3)

This jumper is to select the voltage for CompactFlash™ interface.

Description	Function	Jumper Setting
CompactFlash™ Voltage Selection	3.3V (Default)	
	5V	

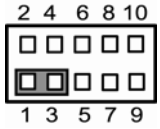
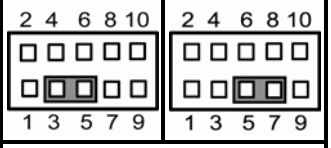
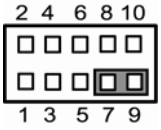
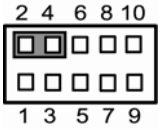
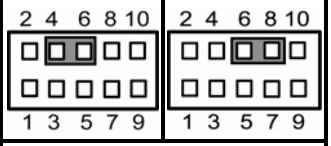
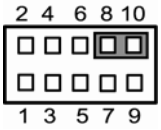
2.3.4 CMOS Clear Jumper (JP4)

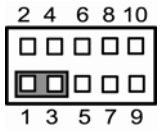
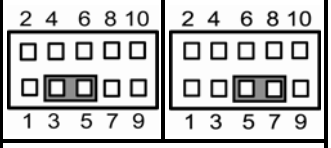
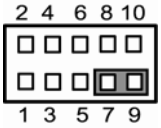
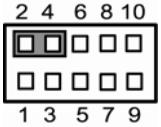
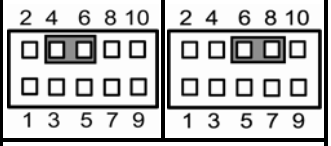
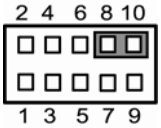
You may need to use this jumper is to clear the CMOS memory if incorrect settings in the Setup Utility.

Description	Function	Jumper Setting
CMOS Clear	Normal (Default)	
	Clear CMOS	

2.3.5 COM1~COM2 Mode Selection Jumpers (JP11, JP13)

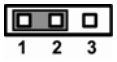
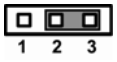
These jumpers select the COM1, COM2 ports' DCD and RI mode.

Description	Function	Jumper Setting
COM1 (JP13)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 9=12V	
	Pin 9=5V	
	*Pin 9=RI (Default)	

Description	Function	Jumper Setting
COM2 (JP11)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=5V	
	*Pin 8=RI (Default)	

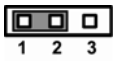
2.3.6 USB Voltage Selection Jumpers (JP9, JP10, JP12)

This jumper is to select the voltage for USB interface.

Description	Function	Jumper Setting
USB Voltage Selection	5V (Default)	
	5V_SBY	

2.3.7 LVDS Voltage Selection Jumper (JP14)

This jumper is to select the voltage for LVDS interface.

Description	Function	Jumper Setting
LVDS Voltage Selection	3.3V (Default)	
	5V	

2.4 Connectors

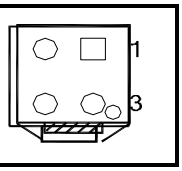
Connectors connect the CPU card with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a summary table shows you all connectors on the **EP850 Series**.

Connectors	Label
Power Connector	ATX2
PCI 104 Connector	CN1
Audio Connector	CN2
Front Panel Connector	CN3
Output Power Connector	CN4
SMBus Connector	CN5
LVDS Backlight Connector	CN6
LVDS Connector	CN9
Serial Port2 Connector	CN10
Digital I/O Connector	CN11
Serial Port1 Connector	CN12
Mini Dim Keyboard/Mouse Connector	CN13
VGA Connector	CN14
LAN1 Connector	LAN1
LAN2 Connector	LAN2
CPU FAN Connector	FAN1
System FAN Connector	FAN2
SATA1 Connector	SATA1
SATA2 Connector	SATA2
USB Connector	USB1
USB Connector	USB2
USB Connector	USB3
CF Connector	SCF1
DDRIII RAM Connector	SDIMM1

2.4.1 Power Connector (ATX2)

Connect the power cable to **ATX2** for +12V ATX power supply, which mainly supplies power to the CPU. If the **ATX2** power connector is not connected, the system will not start.

Pin	Signal	Pin	Signal
1	GND	2	GND
3	+12V	4	+12V

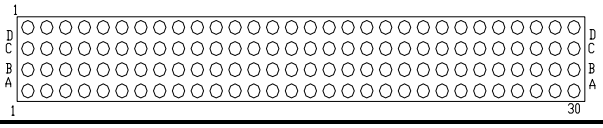


2.4.2 PCI104 Connector (CN1)

The PCI-104 industrial standard and compact form factor of dimensions 3.6" x 3.8" is fully compatible with the ISA Bus. The PCI-104 interface can be applied to off -shelf PCI-104 modules, such as sound module, fax modem module, multi-I/O module.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	N.C	B1	Reserved	C1	+5V	D1	AD0
A2	N.C	B2	AD2	C2	AD1	D2	+5V
A3	AD5	B3	GND	C3	AD4	D3	AD3
A4	C/BE0#	B4	AD7	C4	GND	D4	AD6
A5	GND	B5	AD9	C5	AD8	D5	GND
A6	AD11	B6	N.C	C6	AD10	D6	M66EN
A7	AD14	B7	AD13	C7	GND	D7	AD12
A8	+3.3V	B8	C/BE1#	C8	AD15	D8	+3.3V
A9	SERR#	B9	GND	C9	SB0#	D9	PAR
A10	GND	B10	PERR#	C10	+3.3V	D10	SDONE
A11	STOP*	B11	+3.3V	C11	LOCK#	D11	GND
A12	+3.3V	B12	TRDY#	C12	GND	D12	DEVSEL#
A13	FRAME#	B13	GND	C13	IRDY#	D13	+3.3V
A14	GND	B14	AD16	C14	+3.3V	D14	C/BE2#
A15	AD18	B15	+3.3V	C15	AD17	D15	GND
A16	AD21	B16	AD20	C16	GND	D16	AD19
A17	+3.3V	B17	AD23	C17	AD22	D17	+3.3V
A18	IDSEL0	B18	GND	C18	IDSEL1	D18	IDSEL2
A19	AD24	B19	C/BE3#	C19	N.C.	D19	IDSEL3
A20	GND	B20	AD26	C20	AD25	D20	GND
A21	AD29	B21	+5V	C21	AD28	D21	AD27
A22	+5V	B22	AD30	C22	GND	D22	AD31

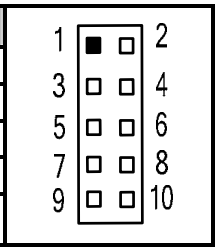
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A23	REQ0#	B23	GND	C23	REQ1#	D23	N.C.
A24	GND	B24	REQ2#	C24	+5V	D24	GNT0#
A25	GNT1#	B25	N.C	C25	GNT2#	D25	GND
A26	+5V	B26	CLK0	C26	GND	D26	CLK1
A27	CLK2	B27	+5V	C27	CLK3	D27	GND
A28	GND	B28	INTD#	C28	+5V	D28	RST#
A29	+12V	B29	INTA#	C29	INTB#	D29	INTC#
A30	N.C	B30	Reserved	C30	Reserved	D30	GND



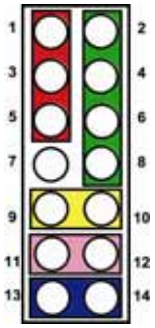
2.4.3 Audio Connector (CN2)

CN2 is a 10pin-header connector commonly used for the audio.

Pin	Signal	Pin	Signal
1	MIC-IN	2	GND
3	Line In L	4	GND
5	Line In R	6	GND
7	Audio Out L	8	GND
9	Audio Out R	10	GND



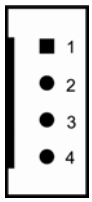
2.4.4 Flat Panel Bezel Connector (CN3)



- **Power LED**
  This 3-pin connector named as Pin 1 and Pin 5 connect the system power LED indicator to such a switch on the case. Pin 1 is assigned as +, and Pin 5 as -. The Power LED lights up when the system is powered ON.
- **External Speaker and Internal Buzzer Connector**
  Pin 2, 4, 6 and 8 can be connected to the case-mounted speaker unit or internal buzzer. While connecting the CPU card to an internal buzzer, please short pins 2-4; while connecting to an external speaker, you need to set pins 2-4 to Open and connect the speaker cable to pin 8 (+) and pin 2 (-).
- **ATX Power On/Off Button**
  This 2-pin connector named as Pin 9 and 10 connect the front panel's ATX power button to the CPU card, which allows users to control ATX power supply to be power on/off.
- **System Reset Switch**
  Pin 11 and 12 can be connected to the case-mounted reset switch that reboots your computer instead of turning OFF the power switch. It is a better way to reboot your system for a longer life of the system's power supply.
- **HDD Activity LED**
  This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, Pin 13 assigned as -, and Pin 14 as +.

2.4.5 Output Power Connector (CN4)

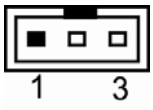
Pin	Signal
1	+12V
2	GND
3	GND
4	+5V



2.4.6 SMBUS Connector (CN5)

Connector **CN5** is for SMBUS interface support.

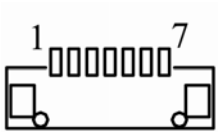
Pin	Signal
1	CLOCK
2	DATA
3	GND



2.4.7 LVDS Backlight Connector (CN6)

The 7-pin inverter connector on the board is with Hirose connector. The matching connector is strongly recommended to use Hirose DF13-7S-1.25C.

Pin	Signal
1	12V
2	12V
3	5V
4	ENABLE
5	GND
6	GND
7	GND



2.4.8 JST Connector for LVDS Flat Panel (CN9)

The board has a 40-pin connector **CN9** for LVDS Interface LCD. It is strongly recommended to use the matching JST SHDR-40V-S-B 40-pin connector for LVDS on the board.

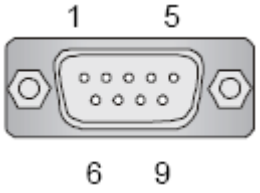
Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.4.9 Serial Port Interface (CN10, CN12)

The board has two onboard serial ports, and +5V/12V power for Pin 1 , Pin 8, or Pin 9, which depends on jumper setting. **CN12** is a standard DB9, and **CN10** a combo connector.

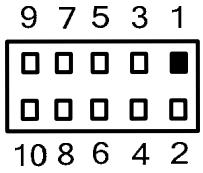
CN12

Pin	Signal
1	DCD, Data Carrier Detect
2	RXD, Receive Data
3	TXD, Transmit Data
4	DTR, Data Terminal Ready
5	GND, Ground
6	DSR, Data Set Ready
7	RTS, Request To Send
8	CTS, Clear To Send
9	RI, Ring Indicator



CN10

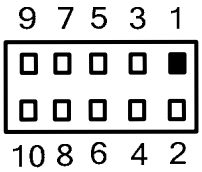
Pin	Signal	Pin	Signal
1	Data Carrier Detect (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request to Send (RTS)
5	Transmit Data (TXD)	6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	NC



2.4.10 Digital I/O Port (DIO) Connector (CN11)

The board is equipped an 8-channel digital I/O connector **CN11** that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers, sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. The digital I/O is controlled via software programming.

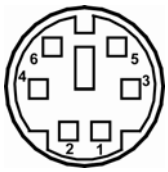
Pin	Signal	Pin	Signal
1	Digital Input 0	2	Digital Output 0
3	Digital Input 1	4	Digital Output 1
5	Digital input 2	6	Digital Output 2
7	GND	8	Digital Output 3
9	GND	10	Digital Output 4



2.4.11 Keyboard and PS/2 Mouse Connector (CN13)

The board provides a keyboard and Mouse interface. **CN13** is a DIN connector (AC97) for PS/2 Mouse and PS/2 keyboard Connection.

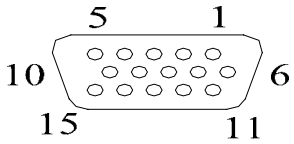
Pin	Signal
1	Keyboard Data
2	Mouse Data
3	GND
4	+5V
5	Keyboard CLK
6	Mouse CLK



2.4.12 VGA Connector (CN14)

CN14 is a standard 15-pin pin DB15 connector commonly used for the CRT VGA display.

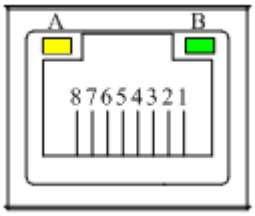
Pin	Signal	Pin	Signal	Pin	Signal
1	Red	2	Green	3	Blue
4	N/A	5	GND	6	AGND
7	AGND	8	AGND	9	N/A
10	GND	11	N/A	12	DDC DAT
13	Horizontal Sync	14	Vertical Sync	15	DDC CLK



2.4.13 Ethernet Connectors (LAN1, LAN2)

The RJ-45 connector is for Ethernet. To connect the board to 100-Base-T or 1000-Base-T hub, just plug one end of the cable into the **LAN1 or LAN2**, and connect the other end (phone jack) to a 100-Base-T hub or 1000-Base-T hub.

Pin	Signal
1	Tx+ (Data transmission positive)
2	Tx- (Data transmission negative)
3	Rx+(Data reception positive)
4	RJ-1(For 100 base T-Only)
5	RJ-1(For 100 base T-Only)
6	Rx- (Data reception negative)
7	RJ-1(For 100 base T-Only)
8	RJ-1(For 100 base T-Only)
A	Active LED
B	100/1000 LAN LED

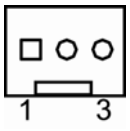


2.4.14 CPU & System Fan Connectors (FAN1, FAN2)

Fan1 is a fan connector for CPU, and **FAN2** for system. Pentium microprocessors require a fan for heat dispensing. The CPU/System fan connectors respectively provide power to the CPU/System fans.

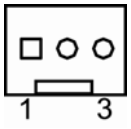
FAN1

Pin	Siganl
1	Ground
2	+12V
3	Sensor



FAN2

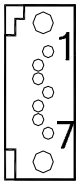
Pin	Siganl
1	Ground
2	+12V
3	Sensor



2.4.15 SATA Connectors (SATA1, SATA2)

The SATA connectors **SATA1** and **SATA2** are for high-speed SATA interface port and it can be connected to serial ATA hard disk devices.

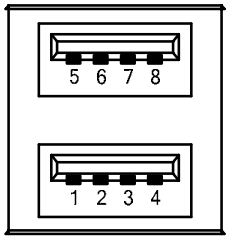
Pin	Signal	Pin	Signal
1	GND	2	SATA_TX+
3	SATA_TX-	4	GND
5	SATA_RX-	6	SATA_RX+
7	GND		



2.4.16 USB Port Connector (USB3)

The **EP850** Series features Universal Serial Bus (USB) connectors, compliant with USB 2.0 (480Mbps) that can be adapted to any USB peripherals, such as monitor, keyboard and mouse.
USB3 is a double-deck USB port connector that consists of two 4-pin standard USB ports.

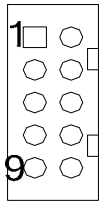
Pin	Signal	Pin	Signal
1	+5V	2	USB DO-
3	USB D0+	4	GND
5	+5V	6	USB D1-
7	USB D1+	8	GND



2.4.17 USB Connectors (USB1, USB2)

The Universal Serial Bus (USB) connector on the board is for the installation of peripherals supporting the USB interface. USB1 and USB2 is a 10-pin standard onboard USB connector.

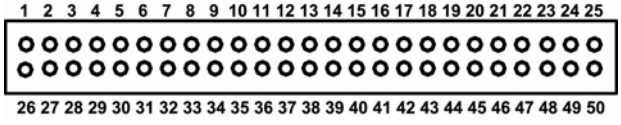
Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	USB D2-	4	USB D3-
5	USB D2+	6	USB D3+
7	GND	8	GND
9	GND	10	GND



2.4.18 CompactFlash™ Socket (SCF1)

The board is equipped with a CompactFlash™ disk socket on the solder side to support an IDE2 interface CompactFlash™ disk card. The socket is especially designed to avoid incorrect installation of the CompactFlash™ disk card. When installing or removing the CompactFlash™ disk card, please make sure the system power is off. The CompactFlash™ disk card is defaulted as the C: or D: disk drive in your PC system.

Pin	Signal	Pin	Signal
1	GND	26	CD1-
2	Data 3	27	Data 11
3	Data 4	28	Data 12
4	Data 5	29	Data 13
5	Data 6	30	Data 14
6	Data 7	31	Data 15
7	CS0#	32	CS1#
8	Address 10	33	VS1#
9	ATASEL	34	IORD#
10	Address 9	35	IOWR#
11	Address 8	36	WE#
12	Address 7	37	INTR
13	VCC	38	VCC
14	Address 6	39	CSEL#
15	Address 5	40	VS2#
16	Address 4	41	RESET#
17	Address 3	42	IORDY#
18	Address 2	43	DMAREQ
19	Address 1	44	DMAACK-
20	Address 0	45	DASP#
21	Data 0	46	PDIAG#
22	Data 1	47	Data 8
23	Data 2	48	Data 9
24	IOCS16#	49	Data 10
25	CD2#	50	GND



CHAPTER 3
HARDWARE DESCRIPTION

3.1 Microprocessors

The **EP850 Series** supports Intel® Core™ 2 Duo and C-M Penryn processors, which make your system operated under Windows 2000/XP and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2 BIOS

The **EP850 Series** uses American Megatrends BIOS with 8Mbit SPI Flash, DMI, Plug and Play.

3.3 System Memory

The **EP850 Series** industrial CPU card supports one 204-pin DDR3 SO-DIMM socket for a maximum memory of 4GB DDR3 SDRAMs. The memory module can come in sizes of 64MB, 128MB, 256MB, 512MB, 1GB and 2GB.

3.4 I/O Port Address Map

The Intel® Core™ 2 Duo and C-M Penryn CPUs can communicate via I/O ports. There are total 1KB port addresses available for assignment to other devices via I/O expansion cards.

Address	Devices
000-00F	DMA controller #1
020-03F	Interrupt controller #1
040-05F	Timer
060-06F	Keyboard controller
070-071	Real time clock, NMI
081-09F	DMA page register
0A0-0BF	Interrupt controller #2
0C0-0DF	DMA controller #2
0F0-0FF	Numeric data processor
170-177 376-376	ATA Channel 1
1F0-1F7 3F6-3F6	ATA Channel 0
3B0-3DF	Chipset Family
400-41F	SMBus controller
3F8-3FF	Serial port #1 (COM1)
2F8-2FF	Serial port #2 (COM2)

3.5 Interrupt Controller

The **EP850 Series** is a 100% PC compatible control board. The mapping list under XP OS is shown as the following screen.

IRQ	Parity check error
IRQ0	System timer output
IRQ1	Keyboard
IRQ2	Interrupt rerouting from IRQ8 through IRQ15
IRQ3	Serial port #2
IRQ4	Serial port #1
IRQ5	PCI Device Share
IRQ7	—
IRQ8	Real time clock
IRQ9	ACPI Controller
IRQ10	—
IRQ11	—
IRQ12	PS/2 Mouse
IRQ13	Math coprocessor
IRQ14	Primary IDE channel
IRQ15	—

MEMO

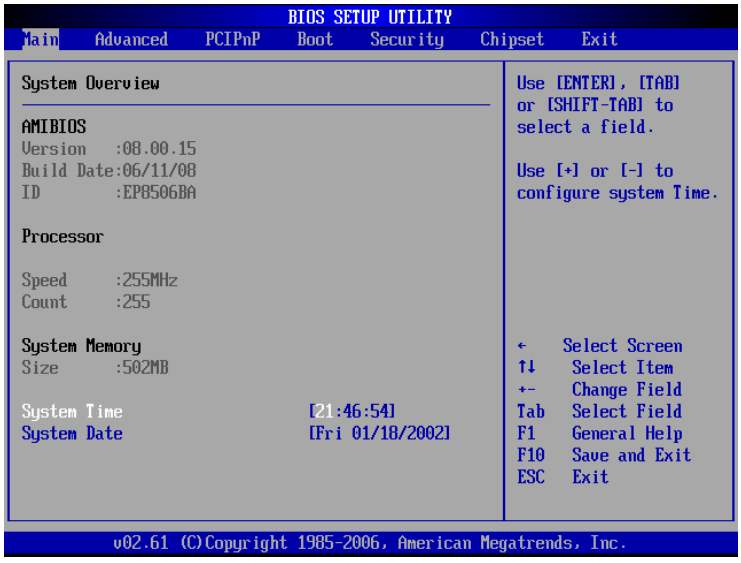
CHAPTER 4
AMI BIOS SETUP UTILITY

This chapter provides users with detailed description how to set up basic system configuration through the AMIBIOS8 BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Delete> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Chipset and Power menus.



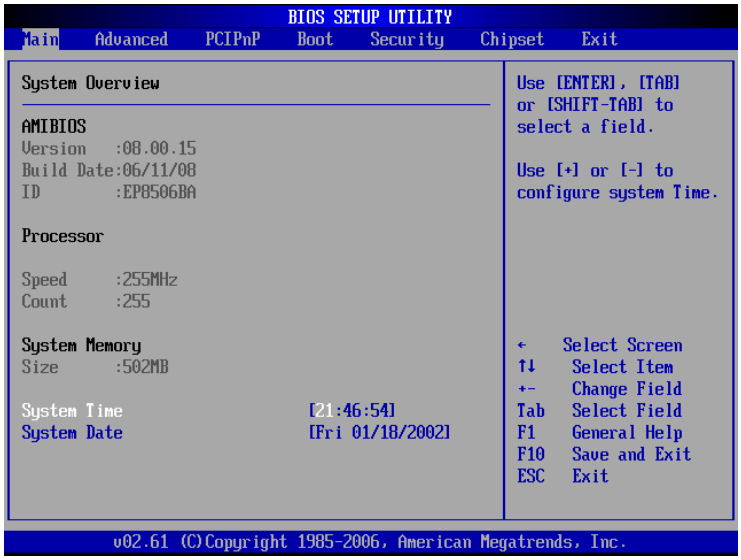
4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.
These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.

Note *Some of navigation keys differ from one screen to another.*

4.3 Main Menu

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



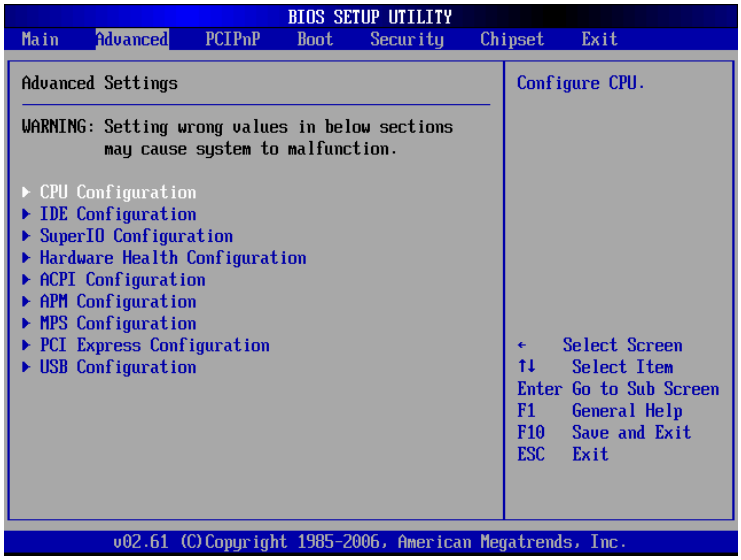
- **System Time/Date**
  Use this option to change the system time and date. Highlight *System Time* or *System Date* using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.4 Advanced Menu

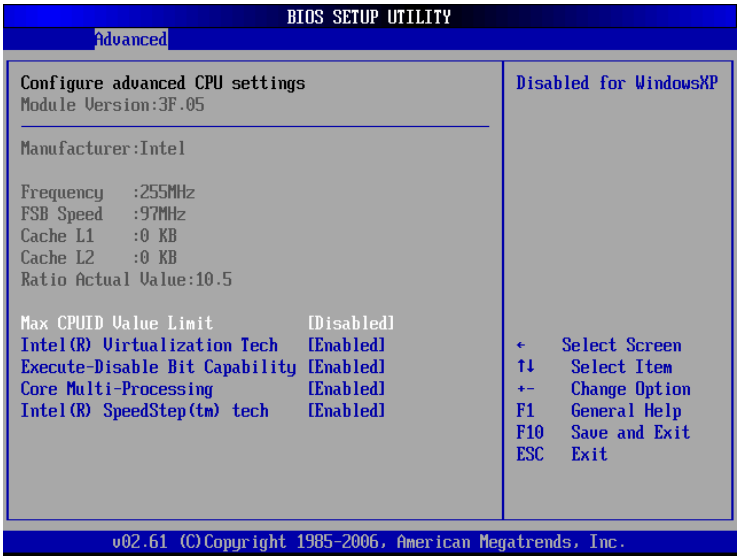
The Advanced menu allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- CPU Configuration
- IDE Configuration
- SuperIO Configuration
- Hardware Health Configuration
- ACPI Configuration
- APM Configuration
- MPS Configuration
- PCI Express Configuration
- USB Configuration

For items marked with "►", please press <Enter> for more options.

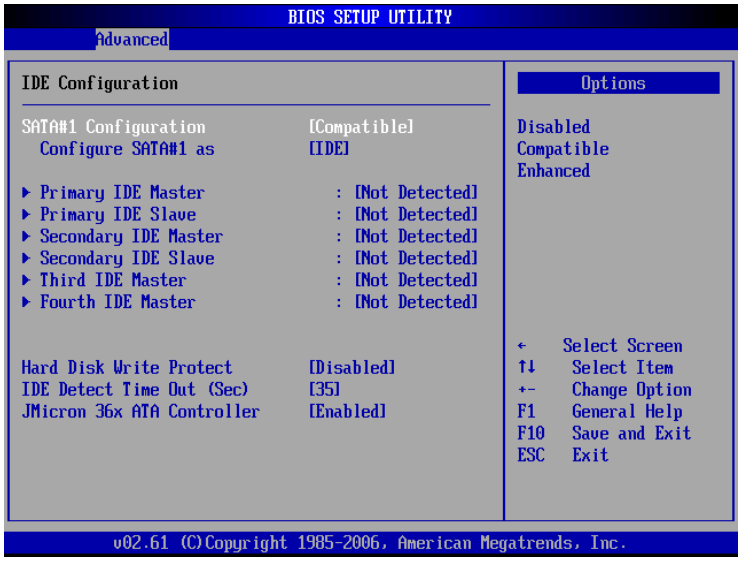


- **CPU Configuration**
  This screen shows the CPU Configuration, and you can change the value of the selected option.



  - **Max CPUID Value Limit**
    You can enable this item to let legacy operating systems boot even without support for CPUs with extended CPU ID functions.
  - **Excute-Disable Bit Capability**
    This item helps you enable or disable the No-Execution Page Protection Technology.
  - **Intel (R) SpeedStep (tm) tech**
    This item helps you enable or disable the Intel SpeedStep Technology.

- **IDE Configuration**
  You can use this screen to select options for the IDE Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.

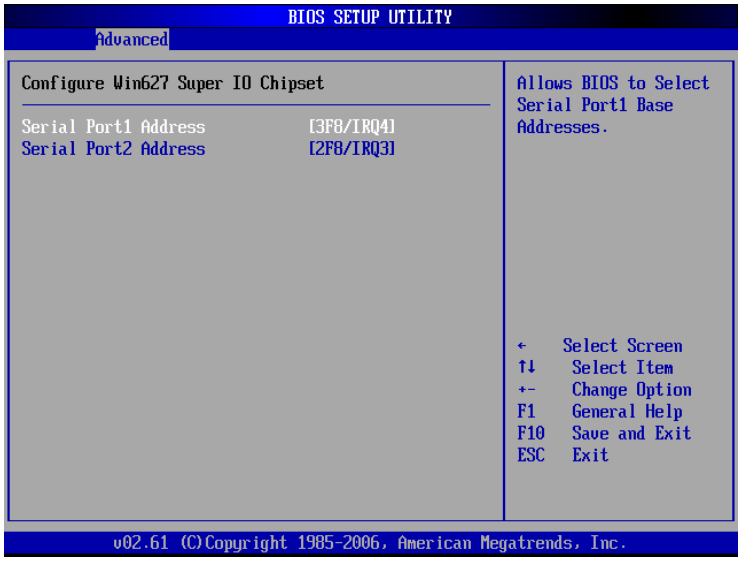

BIOS SETUP UTILITY
Advanced
IDE Configuration
SATA#1 Configuration [Compatible]
Configure SATA#1 as [IDE]
▶ Primary IDE Master : [Not Detected]
▶ Primary IDE Slave : [Not Detected]
▶ Secondary IDE Master : [Not Detected]
▶ Secondary IDE Slave : [Not Detected]
▶ Third IDE Master : [Not Detected]
▶ Fourth IDE Master : [Not Detected]
Hard Disk Write Protect [Disabled]
IDE Detect Time Out (Sec) [35]
JMicron 36x ATA Controller [Enabled]
Options
Disabled
Compatible
Enhanced
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.

  - **Primary/Secondary/Third IDE Master/Slave**
    Select one of the hard disk drives to configure IDE devices installed in the system by pressing <Enter> for more options.

  - **Hard Disk Write Protect**
    Set this option to protect the hard disk drive from being overwritten. The default setting is *Disabled*.

  - **IDE Detect Time Out (Sec)**
    Set this option to stop the AMIBIOS from searching for IDE devices within the specified number of seconds. Basically, this allows you to fine-tune the settings to allow for faster boot times. Adjust this setting until a suitable timing that can detect all IDE disk drives attached is found.

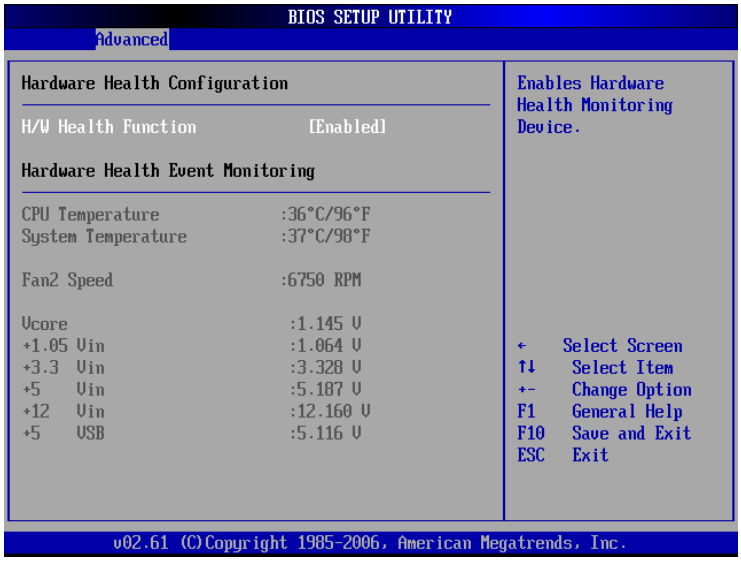
- **SuperIO Configuration**
  You can use this screen to select options for the SuperIO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



  - **Serial Port1 Address**
    This option specifies the base I/O port address and Interrupt Request address of serial port 1. The Optimal setting is *3F8/IRQ4*. The Fail-Safe default setting is *Disabled*.

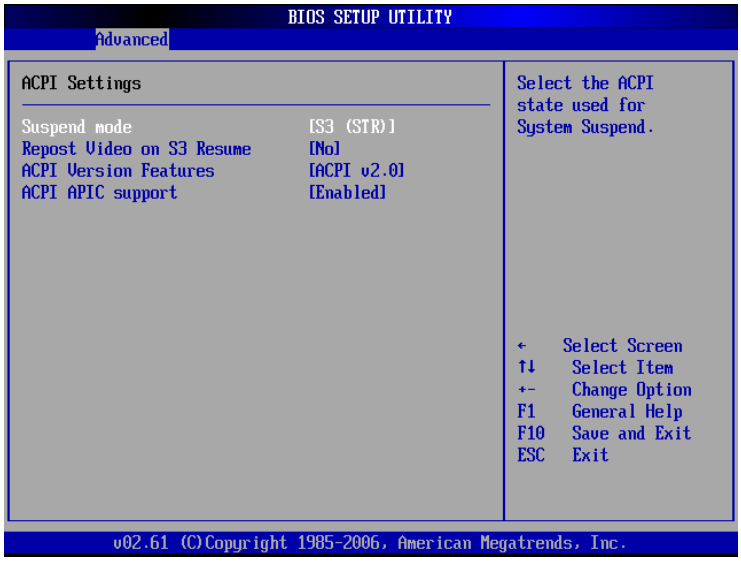
  - **Serial Port2 Address**
    This option specifies the base I/O port address and Interrupt Request address of serial port 2. The Optimal setting is *2F8/IRQ3*. The Fail-Safe setting is *Disabled*.

- **Hardware Health Configuration**
  This screen shows the Hardware Health Configuration, and a description of the selected item appears on the right side of the screen.



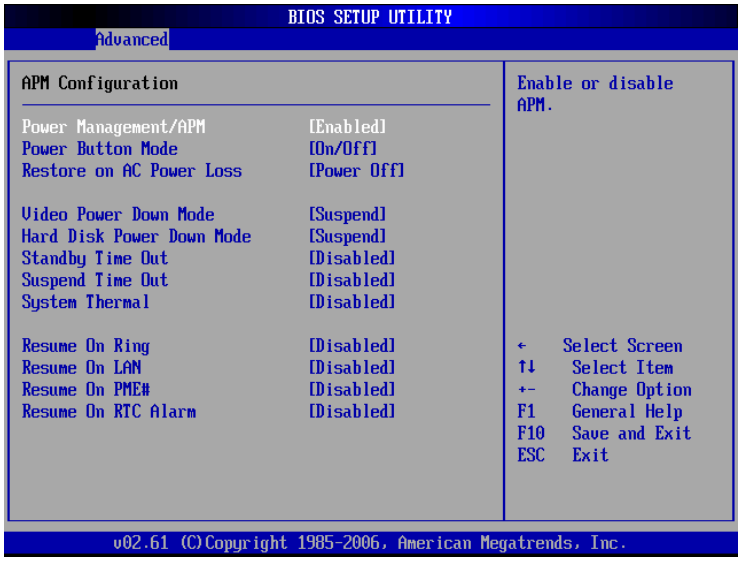
  - **H/W Health Function**
    You can select this item *Enabled* for the Hardware Health Monitoring Device. The Hardware Health Event Monitoring displays the temperature of CPU and System, Fan Speed, Vcore, etc.

- **ACPI Configuration**
  You can use this screen to select options for the ACPI Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



  - **Suspend Mode**
    This item selects the Advanced Configuration and Power Interface (ACPI) state for system suspend.
  - **Repost Video on S3 Resume**
    Set this value to allow video repost support. The default setting is *Yes*.
  - **ACPI Version Features**
    Use this item to set the system to be complaint with the ACPI 2.0 specification.
  - **ACPI APIC support**
    This item allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Application-Specific Integrated Circuit (APIC). Enabling this item makes the RSDT pointer list include the ACPI APIC table pointer.

- **APM Configuration**
  You can use this screen to select options for the APM Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



  - **Power Management/APM**
    Set this value to allow Power Management/APM support. The default setting is *Enabled*.

Disabled	Set this value to prevent the chipset power management and APM (Advanced Power Management) features.
Enabled	Set this value to allow the chipset power management and APM (Advanced Power Management) features. This is the default setting.

- **Power Button Mode**
  This option specifies how the externally mounted power button on the front of the computer chassis is used. The default setting is *On/Off*.

On/Off	Pushing the power button turns the computer on or off. This is the default setting. This is the default setting.
Standby	Pushing the power button places the computer in Standby mode.
Suspend	Pushing the power button places the computer in Suspend mode or Full On power mode.

- **Restore on AC Power Loss**
  There are three selections available: *Power Off*, *Power On* and *Last State*. When the setting is *Power Off*, the system goes into off state after an AC power loss; when *Power On*, the system goes on after an AC power loss.When the setting is *Last State*, the system goes into either off or on state, whatever the system state was before the AC power loss.

- **Video Power Down Mode**
  This option specifies the Power State that the video subsystem enters when the BIOS places it in a power saving state after the specified period of display inactivity has expired. The default setting is *Suspend*.

Disabled	This setting prevents the BIOS from initiating any power saving modes concerned with the video display or monitor.
Standby	This option places the monitor into standby mode after the specified period of display inactivity has expired. This means the monitor is not off. The screen will appear blacked out. The standards do not cite specific power ratings because they vary from monitor to monitor.
Suspend	This option places the monitor into suspend mode after the specified period of display inactivity has expired. This means the monitor is not off. The screen will appear blacked out. The standards do not cite specific power ratings because they vary from monitor to monitor, but this setting use less power than Standby mode. This is the default setting.

- **Hard Disk Drive Power Down Mode**
  This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The default setting is *Suspend*.

Disabled	This setting prevents hard disk drive power down mode.
Standby	This option stops the hard disk drives from spinning during a system standby.
Suspend	This option cuts the power to the hard disk drives during a system suspend. This is the default setting.

- **Standby Time Out**
  This option specifies the length of time the system waits before it enters standby mode. The default setting is *Disabled.*

Disabled	Set this value to prevent the computer system from entering standby mode. This is the default setting.
1 Min	Set this value to allow the computer system to enter standby mode after being inactive for 1 minute.
5 Min	Set this value to allow the computer system to enter standby mode after being inactive for 5 minutes.
10 Min	Set this value to allow the computer system to enter standby mode after being inactive for 10 minutes.

- **Suspend Time Out (Minute)**
  This option specifies the length of time the system waits before it enters suspend mode. The default setting is *Disabled*.

Disabled	This setting prevents the system from entering suspend mode. This is the default setting.
1 Min	Set this value to allow the computer system to enter suspend mode after being inactive for 1 minute.
5 Min	Set this value to allow the computer system to enter suspend mode after being inactive for 5 minutes.
10 Min	Set this value to allow the computer system to enter suspend mode after being inactive for 10 minutes.

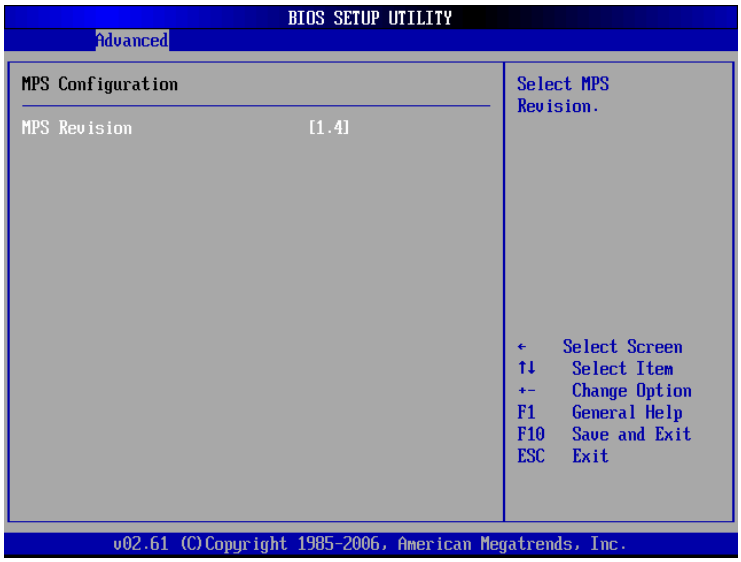
- **Resume On Ring**
  This item enables or disables the function of Resume On Ring that resume the system through incoming calls.

- **Resume On LAN**
  This item enables or disables the function of Resume On LAN that resume the system through the network.

- **Resume On PME#**
  This item enables or disables the function of Resume On PME# (Power Management Event). Enabling this item allows the system to resume from standby mode.

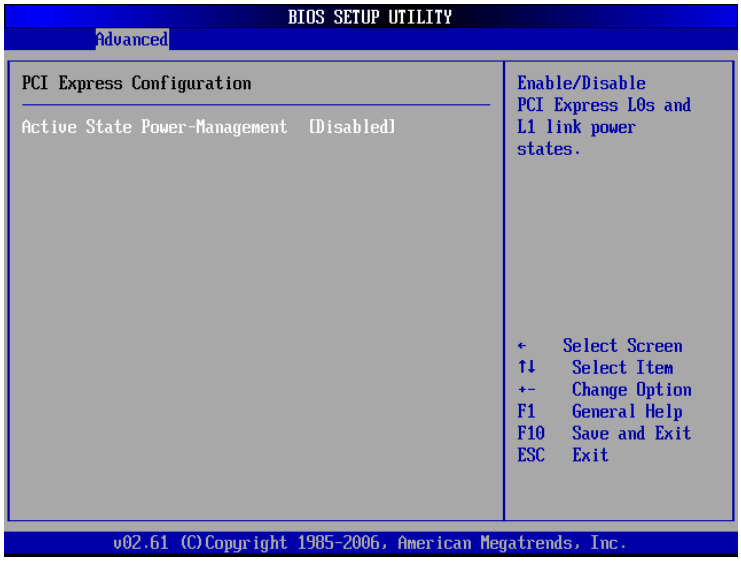
- **Resume On RTC Alarm**
  You can set "Resume On RTC Alarm" item to enabled and key in Data/time to power on system.

- **MPS Configuration**
  This screen shows the MPS (Multi Processor Specification) Configuration, and you can change its value. A description of the selected item appears on the right side of the screen.



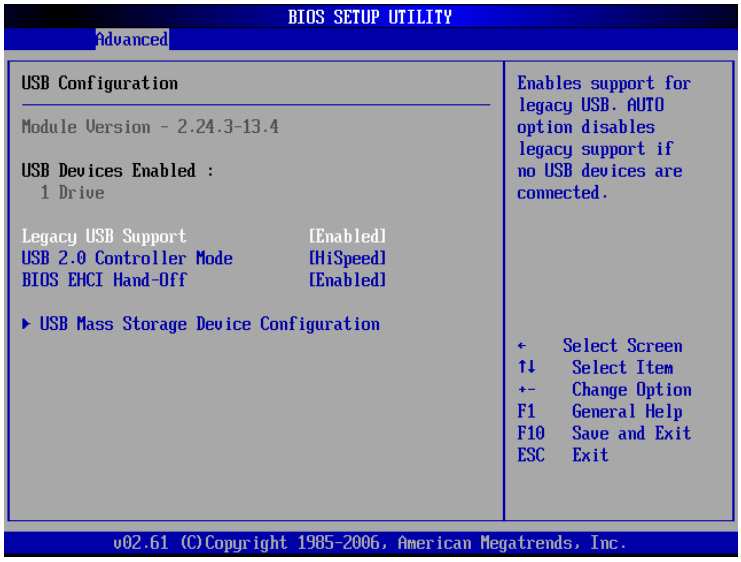
  - **MPS Revision**
    Use this item to select MPS (Multi Processor Specification) Revision 1.1 or 1.4. The default setting is *1.4*.

- **PCI Express Configuration**
  This screen shows the PCI Express Configuration, and you can change its value. A description of the selected item appears on the right side of the screen.



  - **Active State Power-Management**
    Use this item to enable or disable the function of Active State Power-Management to provide you with lower power consumption. The default setting is *Disabled*.

- **USB Configuration**
  You can use this screen to select options for the USB Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.


BIOS SETUP UTILITY
Advanced
USB Configuration
Module Version - 2.24.3-13.4
USB Devices Enabled :
1 Drive
Legacy USB Support [Enabled]
USB 2.0 Controller Mode [HiSpeed]
BIOS EHCI Hand-Off [Enabled]
▶ USB Mass Storage Device Configuration
Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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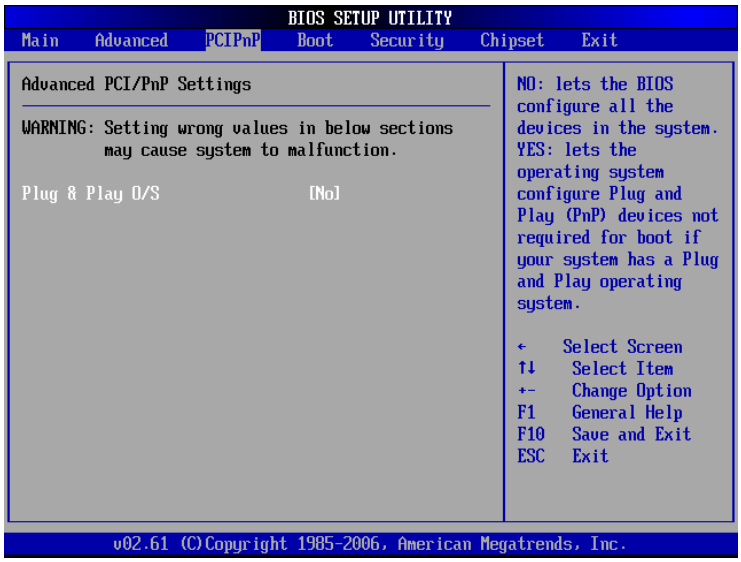
  - **Legacu USB Support**
    Use this item to enable or disable support for USB device on legacy operating system. The default setting is *Enabled*.
  - **USB 2.0 Controller Mode**
    Use this item to configure the USB 2.0 controller. The default setting is *HiSpeed*.
  - **BIOS EHCI Hand-Off**
    Enabling this item provide the support for operating systems without an EHCI hand-off feature. The default setting is *Enabled*.

4.5 PCI PnP Menu

The PCI PnP menu allows users to change the advanced settings for PCI/PnP devices.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced PCI/PnP Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
Plug & Play O/S [No]
NO: lets the BIOS configure all the devices in the system. YES: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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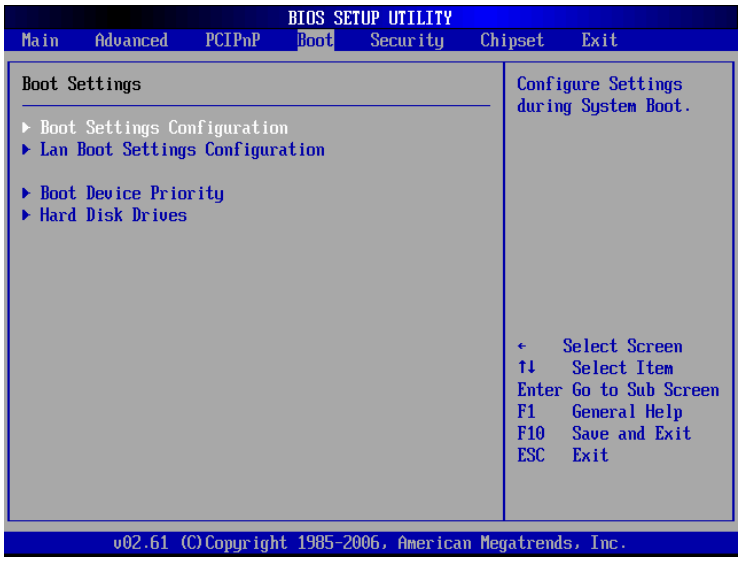
- **Plug & Play O/S**
  When the setting is No, Use this item to configure all the devices in the system. When the setting is Yes and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. The default setting is *No*.

4.6 Boot Menu

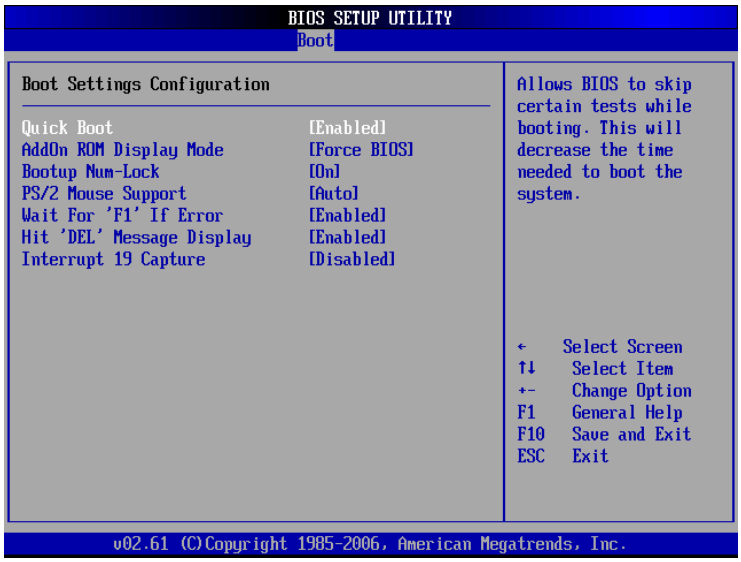
The Boot menu allows users to change boot options of the system. You can select any of the items in the left frame of the screen to go to the sub menus:

- Boot Settings Configuration
- Lan Boot Settings Configuration
- Boot Device Priority
- Hard Disk Drives

For items marked with "►", please press <Enter> for more options.



- **Boot Settings Configuration**


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
PS/2 Mouse Support [Auto]
Wait For 'F1' If Error [Enabled]
Hit 'DEL' Message Display [Enabled]
Interrupt 19 Capture [Disabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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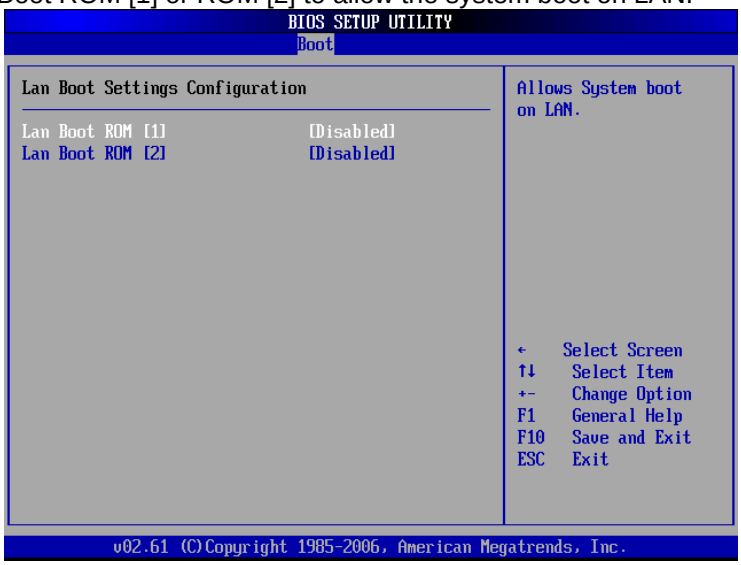
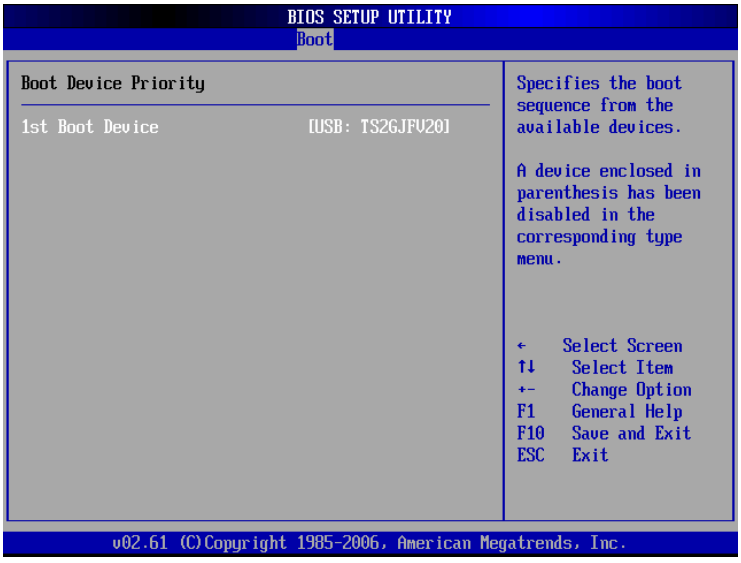
  - **Quick Boot**
    Enabling this item lets the BIOS skip some power on self tests (POST). The default setting is *Enabled*.
  - **AddOn ROM Display Mode**
    This item selects the display mode for option ROM. The default setting is *Force BIOS*.
  - **Boot Num-Lock**
    Use this item to select the power-on state for the NumLock. The default setting is *On*.
  - **Wait For 'F1' Of Error**
    If this item is enabled, the system waits for the F1 key to be pressed when error occurs. The default setting is *Enabled*.
  - **Hit 'DEL' Message Display**
    If this item is enabled, the system displays the message "Press DEL to run Setup" during POST.The default setting is *Enabled*.
  - **Interrupt 19 Capture**
    If this item is enabled, this function makes the option ROMs to trap Interrupt 19. The default setting is *Disabled*.

- **Lan Boot Settings Configuration**
  The Lan Boot Settings Configuration can enable or disable Lan Boot ROM [1] or ROM [2] to allow the system boot on LAN.



- **Boot Device Priority**
  The Boot Device Priority screen specifies the order in which the system checks for the device to boot from the available devices.


BIOS SETUP UTILITY
Boot
Boot Device Priority
1st Boot Device [USB: TS2GJFV20]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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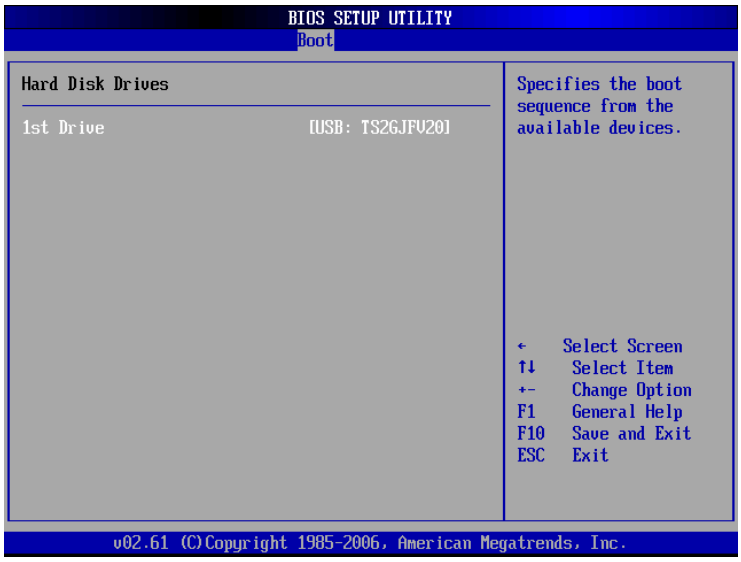
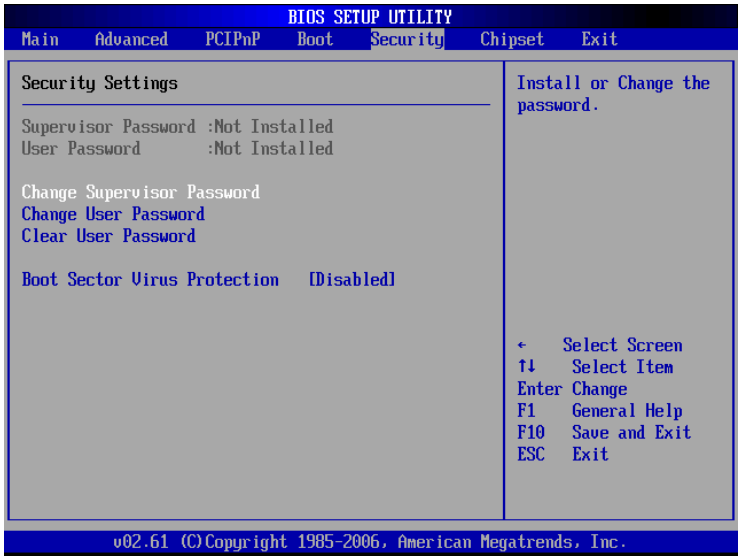
- **Hard Disk Drives**
  Use this screen to view the hard disk drives in the system.



4.7 Security Menu

The Security menu allows users to change the security settings for the system.



- **Supervisor Password**
  This item indicates whether a supervisor password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.

- **User Password**
  This item indicates whether a user password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.

- **Change Supervisor Password**
  Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the supervisor password.

- **Change User Password**
  Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the user password.

- **Clear User Password**
  Select this option and press <Enter> to access the sub menu. You can use the sub menu to clear the user password.

- **Boot Sector Virus Protection**
  This option is near the bottom of the Security Setup screen. The default setting is *Disabled*

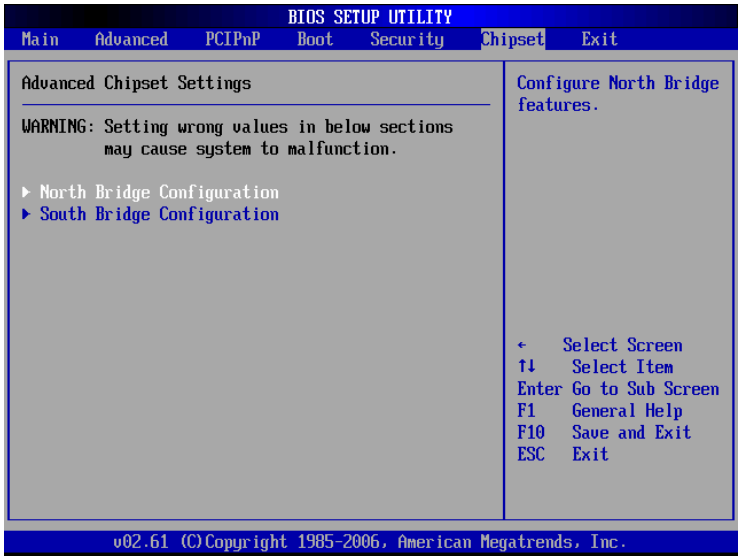
Disabled	Set this value to prevent the Boot Sector Virus Protection. This is the default setting.
Enabled	Select Enabled to enable boot sector protection. It displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. If enabled, the following appears when a write is attempted to the boot sector. You may have to type N several times to prevent the boot sector write. Boot Sector Write! Possible VIRUS: Continue (Y/N)? _ The following appears after any attempt to format any cylinder, head, or sector of any hard disk drive via the BIOS INT 13 Hard disk drive Service: Format!!! Possible VIRUS: Continue (Y/N)?

4.8 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- North Bridge Configuration
- South Bridge Configuration

For items marked with "►", please press <Enter> for more options.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
North Bridge Configuration
South Bridge Configuration
Configure North Bridge features.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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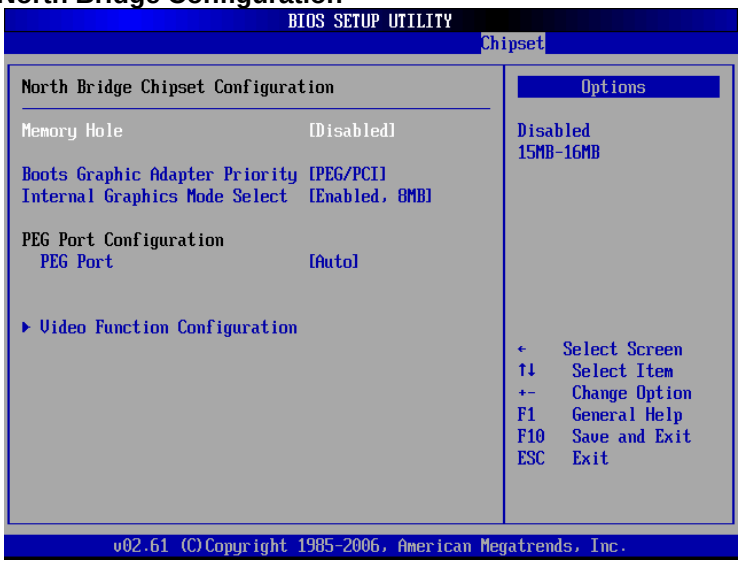
- **North Bridge Configuration**



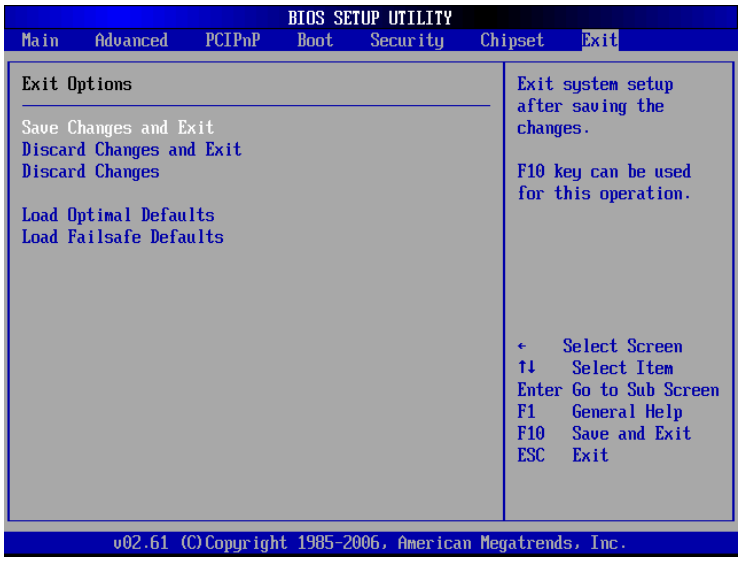
  - **Boot Graphic Adapter Priority**
    This item allows you to select the graphics controller as the primary boot device.
  - **Internal Graphics Mode Select**
    This item allows you to select the amout of system memory used by the internal graphics device.
  - **PEG Port**
    This item allows you to disable or enable PEG port control.

- **South Bridge Configuration**

  - **USB Function/USB 2.0 Controller/HAD Controller**
    These items, respectively, allow you to enable or disable USB/USB 2.0/HAD function/controller.

4.9 Exit Menu

The Exit menu allows users to load your system configuration with optimal or failsafe default values.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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- **Exit Saving Changes**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Exit Saving Changes from the Exit menu and press <Enter>. Select Ok to save changes and exit.

- **Exit Discarding Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Exit Discarding Changes from the Exit menu and press <Enter>. Select Ok to discard changes and exit.

- **Load Optimal Defaults**
  It automatically sets all Setup options to a complete set of default settings when you Select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems.

Select Load Optimal Defaults from the Exit menu and press <Enter>.

- **Load Fail-Safe Defaults**
  It automatically sets all Setup options to a complete set of default settings when you Select this option. The Fail-Safe settings are designed for maximum system stability, but not maximum performance. Select the Fail-Safe Setup options if your computer is experiencing system configuration problems.
  Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. Select Ok to load Fail-Safe defaults

APPENDIX A
WATCHDOG TIMER

Watchdog Timer Setting

After the system stops working for a while, it can be auto-reset by the Watchdog Timer. The integrated Watchdog Timer can be set up in the system reset mode by program.

- Timeout Value Range
  - 1 to 255
  - Minute / Second
- Program Sample

  Watchdog Timer can be set to system reset after 5-second timeout.

2E, 87	
2E, 87	
2E, 07	
2F, 00	Logical Device 0
2E, 2B	Set WDT Funtion Enable
2F, 00	
2E, 07	
2F, 08	Logical Device 8
2E, 30	Activate
2F, 01	
2E, F3	Set Second
2F, N	N = 0 or 4
2E, F4	Set Value
2F, M	M = 00 ~ FF

Using the Watchdog Function

Start
↓
Un-Lock WDT: **O 2E 87 ; Un-lock super I/O**
O 2E 87 ; Un-lock super I/O
↓
Select Logic device:
O 2E 07
O 2F 00
Set WDT Funtion :
O 2E 2B
O 2F C0
Select Logic device:
O 2E 07
O 2F 08
↓
Activate WDT: **O 2E 30**
O 2F 01
↓ **Set Second or Minute :**
O 2E F5
O 2F N **N=00 or 08(See below table)**
↓
Set base timer : **O 2E F6**
O 2F M=00,01,02,…FF(Hex) ,Value=0 to 255
↓
WDT counting
↓
re-set timer: **O 2E F4**
O 2F M ; M=00,01,02,…FF(See below table)
↓
IF No re-set timer: WDT time-out, generate RESET

IF to disable WDT: **O 2E 30**
O 2F 00 ; Can be disable at any time

M	N=0	M	N=0	M	N=0	M	N=8
02	1sec	33	50sec	B5	180sec	11	992sec
03	2sec	38	55sec	BF	190sec	22	2012sec
04	3sec	3D	60sec	C9	200sec	33	3032sec
05	4sec	42	65sec	D3	210sec	43	3992sec
06	5sec	47	70sec	DD	220sec	54	5012sec
07	6sec	4C	75sec	E7	230sec	65	6032sec
08	7sec	51	80sec	F1	240sec	75	6992sec
09	8sec	56	85sec	FB	250sec	86	8012sec
M	**N=0**	**M**	**N=0**	**M**	**N=8**	**M**	**N=8**
0B	10sec	65	100sec	05	272sec	97	9032sec
10	15sec	6F	110sec	06	332sec	A7	9992sec
15	20sec	79	120sec	07	392sec	B8	11012sec
1A	25sec	83	130sec	08	452sec	C9	12032sec
1F	30sec	8D	140sec	09	512sec	D9	12992sec
24	35sec	97	150sec	0A	572sec	EA	14012sec
29	40sec	A1	160sec	0B	632sec	FB	15032sec
2E	45sec	AB	170sec	0C	692sec		

MEMO

APPENDIX B
DIGITAL I/O

Using the Digital I/O Function

Start
↓
Un-Lock Superl /O:
O 2E 87 ; Un-lock super I/O
O 2E 87 ; Un-lock super I/O
↓
Select Enable Digital I/O Function:
O 2E 07
O 2F 00
↓
O 2E 2A
O 2F FC
↓
Select Logic device:
O 2E 07
O 2F 07
↓
Activate Logic Device:
O 2E 30
O 2F 01
↓
Read Data:
O 2E F0
I 2F (default value is E0)

Output Data:
O 2E F1
O 2F FF
Note:
Bit 7~5 => Input pin

Bit 4~0 => Output pin

MEMO